Math 212
Requiz 28B

F 18 Nov 2016 / N 20 Nov 2016

Your name: _____

Exercise

(5 pt) Let $D \subseteq \mathbf{R}^2$ be the region above (!) the x-axis and between the parabolas

$$y^2 = 4 - 4x, \qquad y^2 = 4 + 4x.$$

Our goal is to evaluate the double integral $\iint_D y \, dA$.

(a) (1 pt) Sketch the region D of integration in the xy-plane.

(b) (1 pt) Consider the change of variables $T(u, v) = (x(u, v), y(u, v))$ given by

$$x = 2uv, \qquad y = u^2 - v^2.$$

Compute the Jacobian determinant $\det J_T$. What is its absolute value? (Be explicit.)

(c) (3 pt) Use the change of variables in part (b) to show that $\iint_D y \, dA = 2$.